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Vitasoy USA Ayer MA, Wastewater Treatment Plant Descriptive:

- The plant is a biological system.
- All facility wastewater other than domestic enters the wet well in the screen room at the rear of the plant.
- Three pumps will then transfer the wastewater to 1 of 2 places: thru a screen to remove solids and into a transfer tank that then pumps it to a 129,000 gallon equalization tank or in case of a high strength liquid it can be diverted to a 26,000 gallon tank where it can be slowly fed back into the system.
- From the equalization tank the outflow is controlled to give a constant feed to the bio tower recirc tank. On Monday, the equalization tank is empty. Each day, some wastewater is retained in the equalization tank so by late Friday it is almost full to allow continued flow over the weekend thus avoiding large swings of flow to the system. Aeration is used in the tank to keep from going septic.
- From the bio tower recirc tank the wastewater is passed over the bio tower, dependant on BOD strength, in a ratio of water to air of 4:1, 8:1, or 12:1. Aeration is also used in this tank and pH adjustments are made at this point if needed to keep within discharge parameters.
- Outflow from the bio tower recirc tank goes into the clarifier where a slow moving rake system moves solids to one end of the tank where they are pump into a sludge holding tank. A flocculant is added to aid in solids removal.
- Sludge is pumped from the sludge holding tank into a tanker truck to be incinerated off site, approximately 8,000 gallons daily.
- Outflow from the clarifier passes thru the flume for flow measurement and is discharged into the town's system. An automatic sampler takes a 24-hour composite that is sent out for BOD, TSS, and other testing.

One New England Way, Ayer, Massachusetts 01432
Telephone 978.772.6880 Facsimile 978.772.6881 Web www.vitasoy-usa.com

PROCESS DESIGN SUMMARY

RAW WASTEWATER CHARACTERISTICS

Average Daily Flow = Q_{ave} = 95,743 gallons
Minimum Daily Flow = Q_{min} = 0 gallons
Maximum Daily Flow = Q_{max} =166,500 gallons
Average BOD_5 = BOD_{5ave} = 1,717 mg/l
Maximum BOD_5 = BOD_{5ave} = 2,494 mg/l
Average TSS = TSS_{ave} = 2,000 mg/l (estimated)
Production Period = 10-12 hours per day, one down day/week

RAW WASTEWATER LIFT STATION

Raw Wastewater Sump Capacity = 4,165 gallons at HWL
Number of Pumps = 3
Type of Pumps = Submersible, 5 HP each pump
Pump Performance = 178 GPM @ 26.5 ft. head
Lift Station capability one pump running = 178 GPM
Lift Station capability two pumps running = 356 GPM
Lift Station capability three pumps running = 534 GPM

RAW WASTEWATER SCREENING

Type of Screen = Static Sidehill
Number of Screens = one
Screen Size = 72 inch horizontal woth 0.30 openings
Hydraulic Capacity = 800 GPM

129K TRANSFER SYSTEM

Two Pumps = total output of raw wastewater sump
One Pump backup, One Pump on VFD to trim load

129K Tank

Monday empty, fills over week, empties on weekend

BIOTOWER
Containment Structure Diameter = 38 feet
Height of Media = 28 feet
Volume of Media = 32,000 cubic feet
Type of Media = Synthetic PVC sheet media , 27 - 30 square feet per Cubic foot, minimum void-to -volume ratio = 95 %
Recycle Ratios = Variable, 4:1, 8:1, & 12:1
Organic Loading = 43 lbs. BOD$_5$-day/1,000 cubic feet media At BOD_{5ave} and Q_{ave}
-108 lbs. BOD$_5$-day/1,000 cubic feet media at BOD_{5max} and Q_{max}

Wetting Rates = 904 GPD /1,000 square feet at recycle ratio 4:1
1,808 GPD /1,000 square feet at recycle ratio 8:1
2,732 GPD /1,000 square feet at recycle ratio 12:1

RECYCLE PUMP STATION

Volume = 35,000 gallons
Number of Pumps = 3
Type of Pumps = Submersible 20 HP each pump
Pump Performance = 712 GPM @ 59 ft. head
Recycle Ratio 4:1 = 712 GPM
Recycle Ratio 8:1 = 1,424 GPM
Recycle Ratio 12:1 = 2,136 GPM
Method of Mixing = aeration
Number of blowers = 2
Type of Blower = Centrifugal
Blower Performance = 130 CFM @ 4.3 PSIG
Air to Volume Ratio = 27 CFM/ 1,000 CF one blower running
Type of Diffusers = Fine Bubble
Sodium Hadroide added for PH balance

EFFLUENT CLARIFICATION

Clarifier Size = 12 ft W X 50 ft. L X 9 ft. ave. depth
Clarifier Volume = 40,400 gallons
Overflow Rate = 425 GPD/ square foot @ average flow
1,275 GPD/ square foot @ peak flow
Number of Sludge Removal Pumps = 2
Type of Pumps = Submersible, 1 HP each pump
Pump Performance = 266 GPM @ 24 ft. head
Flocculant added for suspended solids seperation

SLUDGE STORAGE
Storage Tank Volume = 13,275 gallons
Number of Sludge Removal Pumps = 1
Type of Pump = Submersible, 5 HP
Performance of Pump = 266 GPM @ 24 ft. head

DESIGN EFFLUENT CHARACTERISTICS

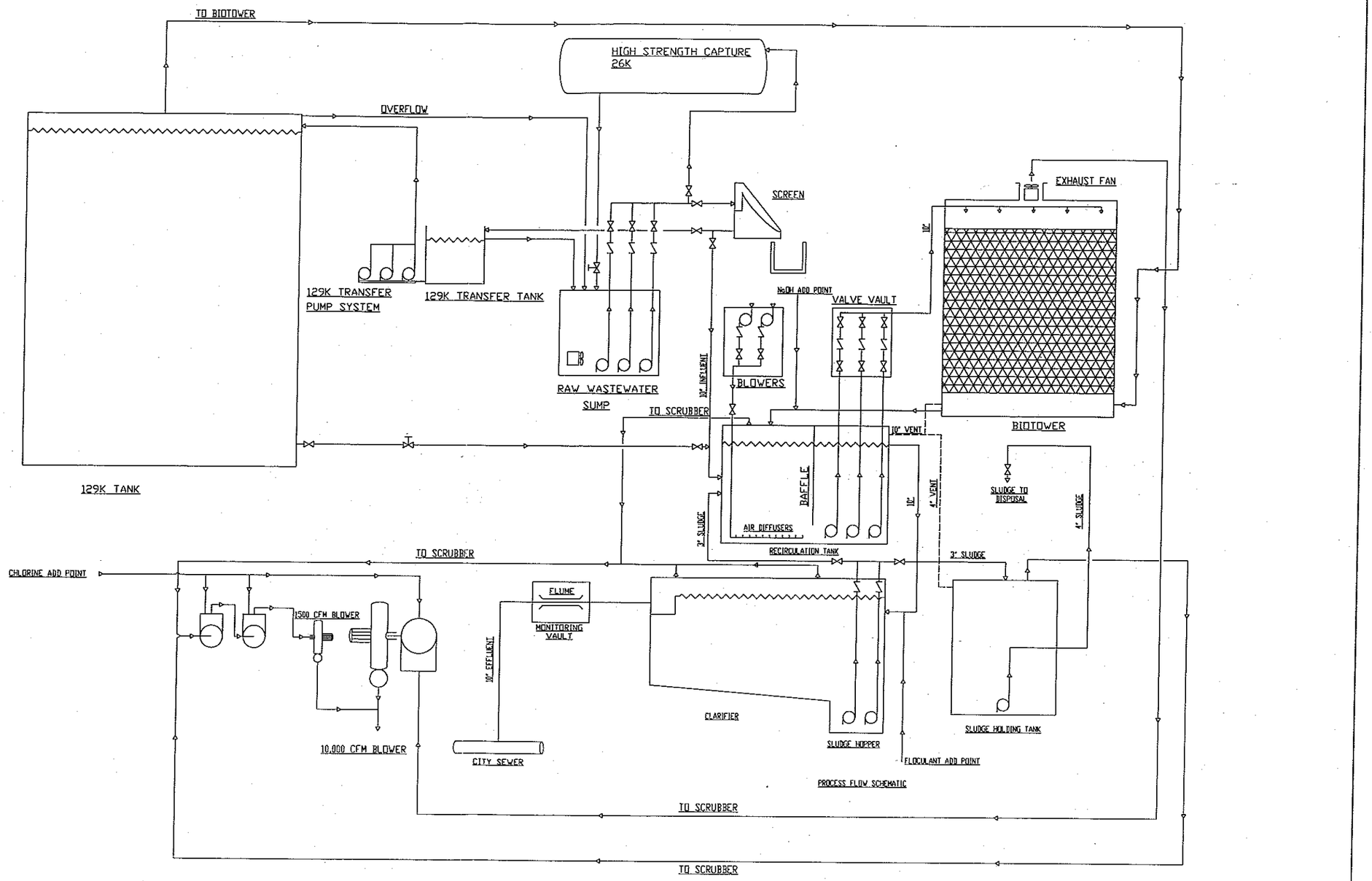
Average BOD$_5$ = 250 mg/l
Average TSS = 250 mg/l

EFFLUENT MONITORING

Type of Flow Measuring Device = Parshall Flume
Type of Flow Monitoring Device = Pressure Transducer - Continuous Strip Chart Recorder
Type of Effluent Sampling- Flow Proportional Composite Refrigerated

Air Scrubber System

1500 CFM blower for ventilation system on Sludge Holding Tank, Clarifier,and Recirculation Tank feeding into
10,000 CFM blower for Biotower ventilation system
Chlorine added for odor control
10" Duct from 129K equalization tank to air intake on Biotower



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
1	Air scrubber information added	2/14/07	DM
2	Added 129K vent pipe	2/12/08	DM

VITASOY

DRAWING TITLE: Wastewater Plant
DRAWING NAME: Process Flow Schematic

DRAWN BY	SIZE	DWG NO.	REV
BS	11 X 17		2
	SCALE NTS	SHEET 1 OF 1	